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SUBJECT: ZHELEZNOGORSK: CLOSED CITY OPENS FOR SEARCH AND RESCUE
SATELLITE DELEGATION

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¶1. (SBU) SUMMARY: Russian and American delegations met in the closed city of Zheleznogorsk June 6-8 to discuss simulated and experimental search-and-rescue (SAR) results from the Russian Global Navigation Satellite System (GLONASS) and the U.S. GPS system as part of their efforts to ensure interoperability and prepare for the implementation of a global Medium-altitude Earth Orbiting Search and Rescue (MEOSAR) system. The Russians detailed their plans to begin deploying GLONASS by 2009 and to have a functioning SAR system by ¶2017. The Americans received a close-up look at the Reshetnev satellite production facility and two GLONASS M satellites. END SUMMARY

COSPAS-SARSAT Working Group

¶2. (SBU) From June 6-8, Russian and American scientists and engineers reviewed action items for the annual GPS-GLONASS Working Group on search and rescue (SAR) satellite systems and the most recent simulations and experimental results. The U.S. delegation included representatives from the National Oceanic and Atmospheric Administration (NOAA), the U.S. Air Force Rescue Coordination Center and the National Aeronautics and Space Administration (NASA). The Russian delegation consisted of representatives of the Science and Industry Corporation of Applied Mechanics (NPO PM), the Russian Institute of Space Device Engineering (RIISDE) and the Federal Space Agency (Roskosmos). (NOTE: NPO PM designs and builds GLONASS satellites. RIISDE is charged with design and deployment of the GLONASS system, both for the global navigation aspect and the search and rescue element. Roskosmos has overall responsibility for launching the satellite program, but the Ministry of Defense exercises ultimate control over use of GLONASS. END NOTE)

¶3. (SBU) Viktor Chebotarev, Chief Design Engineer for NPO PM, outlined the launch schedule for GLONASS M satellites, the model which will supplement and replace the approximately 15 GLONASS satellites currently in orbit. (NOTE: Official claims and media reports of the number of operational GLONASS satellites vary from 10 to 17. END NOTE) According to Chebotarev, three GLONASS M satellites will be launched in September and three more in December, bringing the total deployed--given retirement of obsolete or non-functioning satellites--to 18, the minimum number for operation

of the global navigation system. In 2008 Roskosmos plans three launches that will bring the deployment to a minimum of 24 GLONASS and/or GLONASS M satellites necessary for full configuration of the system (i.e. worldwide coverage). Starting in 2009, Roskosmos will have three launches of the GLONASS K satellite, a larger and more powerful platform with a longer lifespan of 10 years, which Chebotarev characterized as being in the "final design documentation" stage. By 2017, the GOR plans that the GLONASS system will consist entirely of 24 or more GLONASS K satellites with SAR capabilities. The head of the American delegation, Ajay Mehta of NOAA, reported that the United States is currently in the planning phase and could begin to deploy the GPS SAR system in 2016.

14. (SBU) Dr. Vladislav Rogalskiy, Head of the RIISDE Department for Global Navigation Satellite Systems, said that the GLONASS M satellites planned for 2007 launch did not have search and rescue (SAR) transponders, but claimed to some disbelief by the American side that these could be added. He said the SAR components would have a lifespan of 10 years, matching the GLONASS K, which was designed to carry a SAR platform. Rogalskiy added that, in deference to the GPS lead in the field, future GLONASS satellites would operate on two of the radio frequencies used by the GPS satellites. He also outlined the program for setting up the initial ground station, which is located at RIISDE in Moscow, with antennas to receive satellite signals for the Medium Altitude Earth Orbiting (MEO) satellite system. The trials will commence with preliminary tests of one antenna in the third quarter of 2007 and move to final tests of a two-antenna array by the fourth quarter of 2008. He expects accuracy to be within 5 kilometers for 95 percent of the cases. He said the GOR is hoping to obtain support from other countries, mentioning Canada specifically, for installation of the antenna array.

Simulation vs. Reality

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15. (SBU) The American delegation offered results from "experimental" data (i.e. actual satellite and ground station observations) for beacon detection percentage and location accuracy obtained from the seven currently-deployed GPS satellites in the proof-of-concept (POC) system. The criterion for "location accuracy" is detection of one signal burst by four satellites or detection of three signal bursts by each of three satellites. This data showed a cluster of accuracy in northeastern North America, which confirmed expectations based on the angles of inclination and the locations of the ground stations. The United States analysts emphasized that further tests will be undertaken to characterize the planned MEOSAR system more completely.

16. (SBU) Both the American and the Russian representatives presented "simulation" analyses (i.e. computer projections) on expected location accuracy under varying scenarios using various ground stations. The key difference was higher detection percentage and location accuracy from the Russian simulations. The American side attributed this partially to underlying assumptions by the Russian analysts. The Russian delegate presenting simulation results identified wind, waves and ocean current conditions as factors in their results. The Russian side expressed great interest in comparing the American experimental results from actual satellite observations with their simulations.

Closed City Opens Up

17. (SBU) Hidden amidst a green blanket of Siberian pine and birch forests, the city of Zheleznogorsk is visible from the air to planes leaving Krasnoyarsk, 60 kilometers away, with tall stacks belching smoke and steam from the RussAl aluminum factory and the nuclear power plant that produces weapons-grade plutonium. Zheleznogorsk, with a population of 100,000, was founded in 1950 as a city closed to outsiders and devoted to the production of strategic materials for the Soviet military. In a sign of the importance attached to the meetings, the American delegation was met at the outlying gates of

Zheleznogorsk by Nikolay Testoyedov, member of the Russian Academy of Sciences and General Director of NPO PM. The city, graced by elegant buildings designed by Leningrad architects on their own city's model, is a showcase of the modern Soviet city. Ironically, only a very few Russians even knew of its existence, since for a long time it was identified only by its postal code as "Krasnoyarsk 26." (COMMENT: In one scenic site at Krasnoyarsk, we were surrounded by a group of Russian schoolchildren, who told us in English that we were the first Americans they had ever met. We were told that Krasnoyarsk, a city of one million people, has 100,000 university students in its population. END COMMENT)

18. (SBU) As part of the program for the SARSAT delegation, Vasiliy Zvonar, Head of the Satellite Design Sector at NPO PM, arranged for a tour of the satellite production facility. NPO PM is named in Russian fashion for Academician M.F.Reshetnev (pronounced "Reh-shet-nyov, with the accent on the final syllable). Reshetnev is revered in Zheleznogorsk as one of the founders of Soviet space science. Like his teacher Sergey Korolev, known as the father of Soviet rocketry, Reshetnev came to this region of Siberia in 1939 during the purges, but was ultimately restored to his position during World War Two. Zvonar told us that we were the first foreign group ever allowed inside the satellite facility.

19. (SBU) The deputy head of the Satellite Design Sector and the deputy head of the Satellite Production Sector took us to the "clean room" and showed us one of the GLONASS M satellites that underwent vibration testing a day earlier in preparation for launch in September. They said it took up to a year to prepare the satellite for launch. With evident pride in their work, they also allowed us to examine another GLONASS M satellite and explained the design. The satellite is enclosed in a pressurized container to protect the instruments within. The deputy designer noted that the instruments on the GLONASS M were cheaper than on American GPS satellites but of less sturdy construction. Zvonar told us that they sold about five satellite platforms per year to Japanese and French clients, which were loaded with the client's instruments and returned to Russia for launch.

110. (SBU) Our guides also led us to the design and production

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building where the GLONASS K prototypes are under construction. Using nanotechnology, circuits are precisely imprinted by electronic devices on a 40-ton granite slab. However, the "honeycomb panel" aluminum insulation is prepared manually by workers with what appeared to be awls, poking the material to create minute air pockets. We were told that there are 6,000 workers at NPO PM, but there appeared to be very few working in the GLONASS K facility.

The New Space Environment

111. (SBU) Yevgeniy Nesterov, deputy head of the Roskosmos Office of Navigation of Automatic Spacecraft overseeing GLONASS, spoke warmly at a farewell dinner of the cooperation between his agency and NASA. Zvonar toasted GPS and GLONASS as the only two "great" global navigation systems, which was not so much a disparaging reference to the European Galileo system and other global navigation programs, but an acknowledgment of the primacy of Russian-American cooperation. During the meetings, the Russian conferees repeatedly urged cooperation with the other satellite navigation programs and emphasized that ground stations were needed in southern Africa and South America.

112. (SBU) COMMENT: NPO PM officials, RIISDE and Roskosmos extended extraordinarily warm welcomes to the U.S. delegation. They were willing to share their data and details of their plans with little hesitation, except when it came to budget items. The Russian delegation expressed strong interest in continuing to work with their American counterparts. The American delegation would like to encourage them to begin work on the ground elements of the MEOSAR system. Despite GLONASS lagging at this point behind GPS, it is the only other functional global PNT system.

113. (U) NOAA delegation head Ajay Mehta cleared this cable.

